PowerEdge T20

Technical Guide

Quiet and compact, the PowerEdge T20 server is ideal for small and home offices looking to improve productivity and efficiency.

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1 System overview

The PowerEdge T20 mini-tower server packs large internal storage capacity and capable performance into a compact, quiet chassis that delivers efficient, worry-free operation. It is an ideal first server for small offices and home offices (SOHO), and excels at storing and sharing, collaboration and productivity, and data protection. With support for up to six internal hard drives, the T20 enables users to simplify their office IT by consolidating business information, images and videos onto a single server, where it can be more easily shared and protected. Powerful Intel® Xeon® or Pentium® multi-core processors drive applications and media faster, for quicker response times and crisp video performance. The T20's numerous USB ports permit the easy and flexible attachment of external devices, and its small form factor and deskside acoustics allow it to be installed anywhere.

New technologies

Table 1 details new technologies featured on the PowerEdge T20 server.

Table 1. New technologies

New technologies	Detailed descriptions
Intel Xeon processor E3-1200v3 product family and Intel Pentium processors	The Intel Xeon processor E3-1200v3 product family has advanced features that deliver exceptional performance and value. See the Processor section for a full list of processor options.
Intel C226 series chipset	The PowerEdge T20 server uses the Intel Platform Controller Hub (PCH) chip. See the Chipset section for details.
1600MT/s DDR3 ECC memory	The PowerEdge T20 offers up to 32GB (4 DIMM slots) 2GB/4GB/8GB, 1600MT/s unbuffered ECC memory. See the Memory section for details.
Integrated NIC	The PowerEdge T20 features Intel 82579 Gigabit Ethernet LAN 10/100/1000. See the Networking and PCIe section for details.
RAID controller	Intel Rapid Storage Controller software RAID is integrated on the PowerEdge T20 with hardware RAID available with an optional storage controller card. Visit the Storage controllers section for details.

Comparison of selected PowerEdge one-socket tower servers

The PowerEdge T20 builds on the features of the PowerEdge T110 II to offer outstanding performance and value for your small office or home office. Table 2 offers a comparison of the two systems. For the latest information on supported features, visit Dell.com/PowerEdge.

Table 2. Comparing the PowerEdge T110 II to PowerEdge T20

Feature	PowerEdge T110 II	PowerEdge T20
Chassis	1U tower	1U mini-tower

Processors	Intel Xeon processor E3-1200 product family	Intel Xeon processor E3-1200v3 product family, Intel Pentium processors
Front side bus (FSB)	DMI II (Direct Media Interface)	Intel Direct Media Interface
Memory	Up to 32GB (4 DIMMs): 1GB/2GB/4GB/8GB DDR3 up to 1600MT/s	Up to 32GB (4 UDIMM) 2GB/4GB/8GB unbuffered 1600MT/s ECC
Hard drive bays	Up to 4 3.5" SATA/SAS (cabled) hard drives or 6 x 2.5"	Up to 6 internal (cabled) hard drives total: • Up to four 3.5" SATA hard drives, plus • Up to two 2.5" SATA hard drives (require expansion kits) with optional controller card
SATA ports/speed (on-board)	5 ports; 5x3Gbps	4 ports; 2x6Gbps; 2x3Gbps
PCIe & PCI slots	1x16 (x8, 3.0) 1x8 (x8, 3.0) 1x8 (x4, 2.0) 1x4 (x1, 2.0)	1x16 (x16, PCIe 3.0) 1x16 (x4, PCIe 2.0) 1x1 (x1, PCIe 2.0) 1 PCI slot
USB	2 (front), 4 (rear) 2.0	2 (front), 4 (rear) 2.0 2 (front), 2 (rear) 3.0
Internal USB	2 (type-A adapter)	2 (10-pin)
LAN on motherboard (LOM)	1 port	1 port
Power supplies	305W 80+	290W
Systems management	Basic management	Intel Active Management Technology (AMT) 9.0 (with Intel Xeon processors)
Software RAID	PERC S100	Intel Rapid Storage Controller 12.0

PowerEdge T20 base fixed configurations

The PowerEdge T20 offers three fixed configurations with options that enable you to tailor your T20 to best suit your needs. Contact your Dell service representative to:

- Install additional memory and hard drives.
- Add an operating system or application software.
- Add external devices, such as laptops, desktop PCs, printers and projectors.
- Add deployment services to get you up and running.
- Get support services to keep you running smoothly over time.

Table 3 outlines the three base fixed configurations on the T20 as well as additional options.

Table 3. PowerEdge T20 configuration options

Configuration	Description
1	• 1x Pentium processor • 1x 4GB DIMM • No hard drive • No optical drive
2	• 1x Pentium processor • 1x 4GB DIMM • 1x 500GB hard drive • No optical drive
3	• 1x CPU Xeon • 1x 4GB DIMM • 1x 1TB hard drive • No optical drive
Options	• 2nd – 4th DIMM • 2nd – 6th hard drive • Optical drive (DVD) • Operating system

Specifications

Table 4 lists the technical specifications for the PowerEdge T20. For the latest information on supported features, visit Dell.com/PowerEdge.

Table 4. Technical specifications

Feature	PowerEdge T20 technical specification
Form factor	Mini tower (14.17"h x 6.89"w x 17.12"l)
Processors	Intel® Xeon® processor E3-1200v3 product family Intel Pentium® processors
Processor sockets	1 socket
Front side bus or HyperTransport	Intel Direct Media Interface
Cache	3M for dual-core 8M for quad-core
Chipset	Intel C226
Memory[1]	Up to 32GB (4 DIMM slots) 2GB/4GB/8GB 1600MT/s unbuffered with ECC only

Feature	PowerEdge T20 technical specification	
Memory speed	1333, 1600MT/s	
Min/Max RAM	2GB/32GB	
I/O slots	**3 PCIe slots:** • 1 x16 slot (3.0) • 1 x16 slot (2.0) • 1 x1 slot (2.0) **1 PCI slot**	
RAID controller	Intel Rapid Storage Controller 12.0 supporting: • SATA 6Gbps (2 ports: SATA0, SATA1) • SATA 3Gbps (2 ports+ SATA2, SATA3) • 4 SATA connectors support optional additional hard drives and optical drives	
Drive bays	Up to 6 internal (cabled) hard drives in total: • Up to 4 3.5" SATA hard drives, plus • Up to 2 2.5" SATA hard drives (require expansion kits) with optional controller card	
Maximum internal storage	13TB (four x 3.5" 3TB; two x 2.5" 500G)	
Hard drives[1]	**3.5" Client SATA** (7.2K RPM): 500GB and 1TB **3.5" Enterprise** SATA (7.2K RPM): 2TB and 3TB	**2.5" SATA** 2.5" (10K RPM) 250G and 500G 2.5" SATA SSD: 2.5", 6Gb, 160G
Integrated LOM/NIC	Integrated Intel I217 Gigabit Ethernet LAN 10/100/1000	
Power supply	Cabled 290W auto-sensing	
USB	2 (front), 4 (rear) 2.0 2 (front), 2 (rear) 3.0	
Availability	Error Correction Code (ECC) memory; software RAID	
Optical drive	5.25" slim optical drive slot	
Video	Integrated Intel HD Graphics P4600 with 2x DP + 1x VGA* Integrated Intel HD Graphics 4600 with 2x DP + 1x VGA *	
Systems management	Intel AMT 9.0 (with Xeon processor only)	
Operating systems	Microsoft Windows Server 2012 Microsoft Windows Server 2012 R2	

*Integrated graphic varies, depending on CPU offerings.

2 Chassis views and features

The Dell PowerEdge T20 is a one-socket tower server. For additional system views and features, see the *Dell PowerEdge T20 Systems Owner's Manual* on Dell.com/Support/Manuals.

Chassis views

This chassis should be supported in the configurations detailed in Table 5.

Table 5. Chassis configurations

Number of drive bays	Drive types	Controller	Front control panel	Power supply	Rack option
4 cabled drive bays	3.5" SATA or 2x 2.5" + 4x 3.5" cabled hard drives	Intel Rapid Storage Controller 12.0	LED	Cabled 350W	No

Figure 1 shows the features on the front of the T20 chassis with the USB connectors and other components and features described in this guide.

Figure 1. Front panel view and features

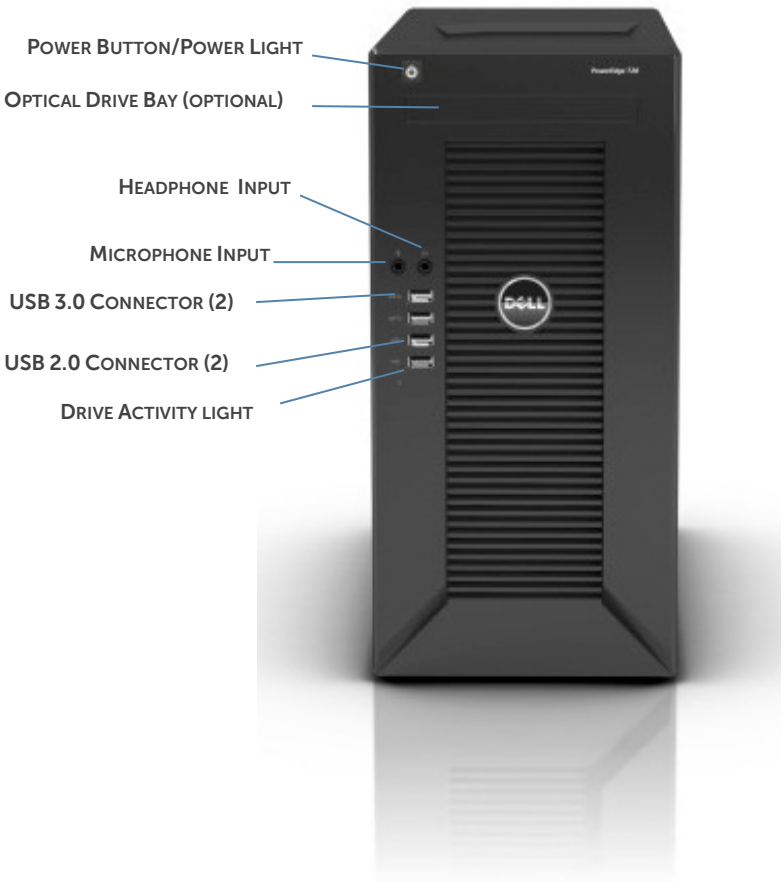
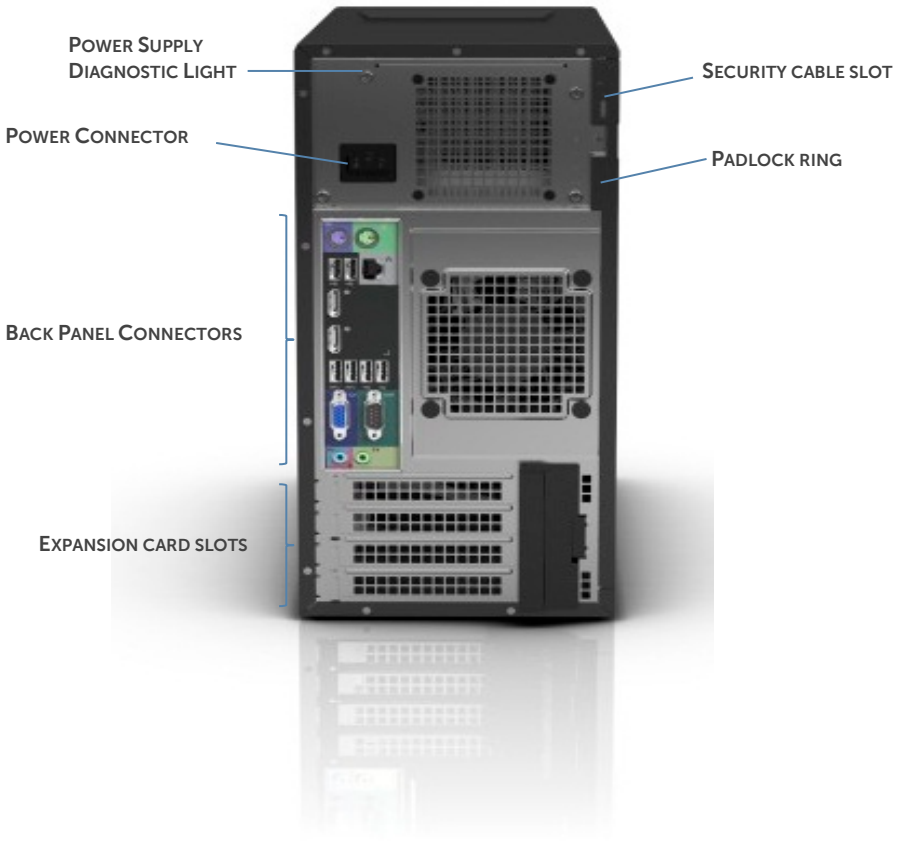


Figure 2 shows the features on the back of the T20 chassis with components and features described in this guide.

Figure 2. Back panel view and features



Chassis features

Table 6 lists the PowerEdge T20's many chassis features. For additional information, see the *Dell PowerEdge T20 Systems Owner's Manual* on Dell.com/Support/Manuals.

Table 6. Chassis features

Feature	Description
Power button	ACPI-compliant power button with an integrated green power LED
Front bezel	Covers the server's front-loading hard drives and locks for security
NMI button	Used to troubleshoot software and device driver errors; use only if directed by qualified support personnel or by the operating system's documentation
System identification button	Buttons on the back and front of a system to help identify the unit in a data center environment
Hard drives	Up to four 3.5" SATA hard drives, plus Up to two 2.5" SATA hard drives (require expansion kits) with optional controller card

Feature	Description
USB connectors	Connects USB devices to the server
Information tag	Slide-out label panel for recording system information
Video connector	Connects a monitor to the server; one port on the back of the tower chassis or a port on both the front and back of the rack chassis
LCD panel and buttons	Displays system ID, status information and system error messages; two navigation buttons on the hot-plug chassis to scroll through the menu on the LCD and one select button
Optical drive (optional)	Optional half-height DVD or DVD+RW drive
Power supply units	Supplies power to the server
Power supply indicators	Indicates whether server has power
NIC indicators	Indicates network activity and status
PCIe slots	Connects PCIe expansion cards to the server
Ethernet connectors	Connects integrated 10/100/1000 NICs to the server
Serial connector	Connects a serial device to the server

Quick Resource Locator

Dell PowerEdge 12th generation servers feature a Quick Resource Locator (QRL) — a model-specific Quick Response (QR) code that is located inside the T20 chassis cover (see Figure 3). Use your smartphone to access the Dell QRL app to learn more about the server.

Figure 3. QRL location

This QRL code allows you to:

- View step-by-step videos, including overviews of system internals and externals, as well as detailed, concise, task-oriented videos and installation wizards.
- Locate reference materials, including searchable owner's manual content, LCD diagnostics and an electrical overview.
- Look up your service tag so you can quickly gain access to your specific hardware configuration info and warranty information.
- Contact Dell directly (by link) to get in touch with technical support and sales teams and provide feedback to Dell.

These codes provide an easy way to retrieve the critical support information you need when you need it, making you more efficient and effective in managing your hardware.

Security features

The latest generation of PowerEdge servers has the features listed in Table 7 to help ensure the security of your data center.

Table 7. Security features

Security feature	Description
Cover latch	A tooled latch is integrated in the top cover to secure it to the rack chassis.
Front bezel	A metal bezel is mounted to the chassis front to provide the Dell ID. A lock on the bezel is used to protect un-authorized access to hard drives. System status is viewable on the LCD or LED panel when the bezel is installed.
TPM	The Trusted Platform Module (TPM) is used to generate/store keys, protect/authenticate passwords and create/store digital certificates. It also supports the Intel Xeon TXT functionality. TPM can also be used to enable the BitLocker™ hard drive encryption feature in Windows Server 2008. TPM 1.2 is supported. No TPM version is available for China or Russia.
Power-off security	BIOS has the ability to disable the power button function.
Intrusion alert	An internal switch is used to detect chassis intrusion.
Secure mode	BIOS has the ability to enter a secure boot mode through system setup. This mode includes the option to lock out the power and NMI switches on the control panel or set up a system password.

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3 Processor

The Dell PowerEdge T20 offers Intel Pentium processors and the next-generation Intel Xeon processor E3-1200v3 product family, which features enhanced media, graphics capabilities, flexibility and enhanced security. Manufactured on industry-leading 22nm process technology with 3D Tri-Gate transistors, the Intel Xeon processor E3-1200v3 family offers numerous advancements over the Intel Xeon processor E3-1200v2 family.

Processor features

The Intel Xeon processor E3-1200v3 product family features include:

- Enhanced energy efficiency and performance
- Support for ECC memory for better data integrity, reliability and system uptime
- High-end media and graphics capabilities for devices that display videos, 2D and 3D graphics and interactive content
- Intel Turbo Boost Technology 2.0 to accelerate processor and graphics performance for peak loads
- Intel Hyper-Threading Technology for faster performance for demanding business applications
- Continued improvements to both Intel TXT and AES-NI help to better protect systems and data

Supported processors

Table 8 lists the Intel processors supported by the PowerEdge T20. For the latest information on supported processors, visit Dell.com/PowerEdge.

Table 8. Supported processors

Model	Speed	TDP	Cache	Cores/ threads	Max memory speed	Turbo
Xeon E3-1225v3	3.2GHz	84W	8MB	4/8	1600MT/s	Yes
Pentium G3220	3.0GHz	54W	3MB	2/2	1333MT/s	MP

For more information supported Intel processors, visit Intel.com. For information on processor installation and configuration, see the *Dell PowerEdge T20 Systems Owner's Manual* on Dell.com/Support/Manuals.

Chipset

The Intel C226 chipset is implemented on the Dell PowerEdge T20. For more information, visit Intel.com.

4 Memory

More options are available for the Dell PowerEdge 12th generation servers than in previous generations — more capacity choices and more frequency choices. The PowerEdge T20 supports up to 32GB of memory with speeds of up to 1600MT/s, providing high performance in a variety of applications.

Supported memory

The T20 supports memory speeds of 1600MT/s and 1333MT/s, depending on the DIMM types installed and the configuration. All memory on all processors and channels runs at the same speed and voltage. By default, the system runs at the highest speed for the channel with the lowest DIMM voltage and speed.

The T20 supports the DIMMs listed in Table 9. For the latest information on supported memory, visit Dell.com/PowerEdge.

Table 9. DIMMs supported

Capacity	Speed	Type	Ranks per DIMM
2GB	1333/1600MT/s	UDIMM	1
2GB	1333/1600MT/s	UDIMM	1
4GB	1333/1600MT/s	UDIMM	1
4GB	1333/1600MT/s	UDIMM	1
4GB	1333/1600MT/s	UDIMM	2
8GB	1333/1600MT/s	UDIMM	2
8GB	1333/1600MT/s	UDIMM	1
8GB	1333/1600MT/s	UDIMM	2
16GB	1333/1600MT/s	UDIMM	2
16GB	1333/1600MT/s	UDIMM	2
32GB	1333/1600MT/s	UDIMM	2

5 Storage

The Dell PowerEdge T20 supports up to four 3.5-inch hard drives and up to two 2.5-inch hard drives.

- 4x 3.5-inch cabled drive bays from motherboard SATA connector
- 3x 3.5-inch cabled SATA, plus SATA optical disk drive device from motherboard SATA connector
- 2x 2.5-inch cabled SATA via add-on storage controller, plus 4x 3.5-inch cabled SATA from motherboard SATA connector

Supported hard drives

Table 10 lists the PowerEdge T20 hard drive options. For additional information, see Dell.com/PowerEdge.

Table 10. Supported hard drives

Form factor	Type	Speed (rpm)	Capacities
2.5"	SATA	10K	250GB, 500GB
	SATA SSD	6Gb	160GB
3.5"	SATA	7.2K	500GB, 1TB
	Enterprise	7.2K	2TB, 3TB

Storage controllers

The PowerEdge T20 supports Intel Rapid Storage Controller 12.0 software RAID and hardware RAID from the optional storage controller card available at Dell.com.

StarTech Part #: PEXSAT32
Dell Part#: A4046565

The **PEXSAT32 2-Port PCIe SATA 6GB controller card** offers simple connectivity between a host computer and SATA 3.0 devices — a cost-effective solution for connecting high-speed storage, such as High RPM hard drives and solid state drives (SSD), which in turn allows for easier data backups and archiving.

Note: Additional SATA cables are required to connect the card with fourth and fifth hard drives and an additional power extension cable is required to connect the system power to these drives.

Optical disk drive

The PowerEdge T20 supports one internal slim optical drive and is able to boot from any internal optical drive. Table 11 lists supported optical disk drive options.

Table 11. Optical disk drive options

Optical disk drive	Supported
Slimline 6X Blu-ray Writer SATA 1.5Gbps	Yes
Slimline 8X DVD+/-RW[1] SATA 1.5Gbps	Yes
Slimline 8X DVD-ROM[2] SATA 1.5Gbps	Yes

The PowerEdge T20 server supports "no optical drive" configurations, support for optional internal DVD-ROM (SATA) and support for optional internal DVD+RW (SATA).

Note: An additional power extension cable is required to connect the system power to fourth and fifth hard drives, and an optical disk drive.

6 Networking and PCIe

The Dell PowerEdge T20 offers balanced, scalable I/O capabilities, including integrated PCIe 2.0- and 3.0-capable expansion slots.

Integrated NIC controller

The PowerEdge T20 has an integrated Intel Ethernet Connection I217 chip for performance-enhancing features:

- Cost-optimized single GbE (1GbE)
- Small 6x6mm quad-flat, no-leads (QFN) package
- Intel power optimizer
- 500mW TDP with typical ~ 400mW GbE
- Energy-Efficient Ethernet (EEE)

Table 12 outlines additional specifications of the Intel Ethernet Connection I217.

Table 12. Intel Ethernet Connection I217

Features	External connector type	RJ45
	Data rates supported	10/100/1000Mbps
	Controller bus architecture	PCIe-based interface for S0 state, SMBus for Sx low power state
	Integrated memory	No
	Data transfer mode (example Bus-Master DMA)	No
	Power consumption (full operation per data rate connection speed)	535mW (Maximum)
	Power consumption (standby operation)	176mW (Maximum)
	IEEE standards compliance (example 802.1P)	802.3
	Boot ROM support	EEPROM (located in SPI)
Network transfer mode	Network transfer rate • 10BASE-T (full-duplex) 20Mbps • 100BASE-TX (half-duplex) 100Mbps • 100BASE-TX (full-duplex) 200Mbps • 1000BASE-T (full-duplex) 2000Mbps	10Mb (full/half-duplex) 100Mb (full/half-duplex) 1000Mb (full-duplex)
Environmental	Operating temperature	0° to 85°C (32° to 185°F)

	Operating humidity	20% to 80% (non-condensing)
	Operating system driver support	Microsoft Windows 7 32/64, Microsoft Windows 8 32/64
	Manageability	Wake On LAN (WOL) Pre-boot eXecution Environment (PXE) 2.1
	Management capabilities and alerting	Intel Standard Manageability Intel Core 2 Duo/Quad Processor with vPro Technology

PCIe expansion

PCIe connectivity is integrated with the processor. The T20 supports up to four PCIe slots. PCI card dimensions are outlined in Table 13.

- 1x PCIe x16 slot 3.0
- 1x PCIe x16 (wired x4) slot 2.0
- 1x PCIe x1 slot 2.0
- 1x PCI 32/33 slot

Table 13. PCI card dimensions

Type	Voltage supported	Max height	Max length	Max wattage	Cards supported
PCIe x16 3.0	3.3V/12V	4.38 in/11.13 cm full height	6.6 in/16.77 cm half length	75*	Graphics Gigabit NIC Parallel/Serial
PCIe x1 2.0	3.3V/12V	4.38 in/11.13 cm full height	6.6 in/16.77 cm half length	25	Gigabit NIC Parallel/Serial
PCI	3.3V/5V/12V/-12V	4.38 in/11.13 cm full height	6.6 in/16.77 cm half length	25	1394
PCIe x16 (x4) 2.0	3.3V/12V	4.38 in/11.13 cm full height	6.6 in/16.77 cm half length	25*	Graphics, Gigabit NIC Parallel/Serial

7 Power, thermal and acoustics

Lower overall system-level power draw is a result of breakthrough system design. The Dell PowerEdge T20 server maximizes performance per watt through a combination of power and cooling, energy-efficient technologies and tools. Additionally, the PowerEdge T20 has an extensive collection of sensors that automatically track thermal activity, which helps regulate temperature, thereby reducing server noise and power consumption.

Power management

Table 14 summarizes power management features on the PowerEdge T20.

Table 14. Power management features

Feature	Type	Enable/Status/Ctrl bit location	Description
ACPI mode switch	Fixed	PCH	The operating system uses the SCI_EN bit in PCH to switch from legacy mode to ACPI mode.
Sleep states	Fixed	PCH	Supported states: S0 (Working), S4-OS ('Hibernation'), and S5 (Soft-off). S1 (also called 'standby' or 'suspend') and S3 are not supported.
Power button	Fixed	PCH	In ACPI mode, the operating system has control of the power button. In non-ACPI mode, SMI handler owns power button events.
Real-time clock (RTC)	Fixed	PCH	The operating system is able to configure the system to wake on the RTC alarm.
Power management timer	Fixed	PCH	PCH 32-bit power management timer is used.
Power management event (PME)	Generic	PCH	When a device signals PME, the system wakes (if necessary), the OS detects the event, and a Dell-defined ASL routine handles the event. Wake-on-LAN is one example of a PME.
DBS	N/A	Processor MSRs	This feature does P state transition under Windows.
C state support	N/A	Processor and PCH registers	This feature allows multiple C state support for the processor. This feature will work under Windows and ACPI OS that understand C states.

Power supply unit

The PowerEdge T20 includes a single 290W cabled auto-sensing power supply that provides power to the T20 planar, the four internal hard drive bays and the two 2.5" internal drive bays. Table 15 details Power supply specifications.

Table 15. Power supply specifications

Specification	290W AC
Current consumption	10A–5A
Supply voltage	100–240VAC[1]
Frequency	50/60Hz
Heat dissipation (BTU/hr max.)	989

Thermal and acoustics

Optimized thermal management makes the PowerEdge T20 cool and quiet. Benefiting from a smart cooling thermal control algorithm, the T20 offers both high performance and quiet acoustics across a wide range of ambient temperatures (5°C ~ 35°C). Though the fan-induced sound is inevitable for cooling purposes, it is controlled to be smooth and quiet. In a typical office environment (~45dBA), the sound is almost unnoticeable.

8 Operating systems and virtualization

The Dell PowerEdge T20 supports a wide range of industry-standard operating systems and virtualization software.

Supported operating systems

Table 16 details the primary operating systems supported on the PowerEdge T20. For the latest information on supported operating systems, see Dell.com/OSsupport.

Table 16. Primary operating systems supported

Operating system	Platform	Edition
Microsoft Windows Server 2012	X64	Foundation Essentials Standard
Microsoft Windows Server 2012 R2	X64	Foundation

Supported virtualization

Table 17 highlights the virtualization support for the T20.

Table 17. Virtualization support

Operating systems	Factory options	Internal dual SD module install support
Red Hat Enterprise Virtualization 6.5	DIB	Yes

DIB = drop-in-box

9 Systems management

The PowerEdge T20 offers Intel Active Management Technology (AMT). Intel Xeon platforms equipped with Intel AMT can be managed remotely, regardless of whether they are powered up or have a functioning operating system.

Intel AMT Manageability Server 9.0 features include:

- Intel Intelligent Power Node Manager
- Power Management service assisting BMC
- Boot control
- Power state management
- Hardware/software inventory
- Hardware alerting
- Audit logs
- Microsoft Network Access Protection (NAP)
- Fast-call for help; remote schedule maintenance
- Measured AMT
- KVM remote control and re-direction/enhancements
- PC alarm clock
- Firmware upgrade/downgrade
- Host-based setup and configuration
- AMT graceful shutdown

Server and embedded server management

The Dell T20 is Intelligent Platform Management Interface (IPMI) v2.0 compliant.

Appendix A. Additional specifications

System dimensions and weight

Table 18 details the dimensions and weight of the Dell PowerEdge T20.

Table 18. PowerEdge T20 dimensions and weight

PowerEdge T20	
Height	14.17 in/36 cm
Width	6.89 in/17.5 cm
Depth	17.12 in/43.5 cm
Weight	18.72 lbs/8.49 kg

Environmental specifications

Table 19 offers environmental specifications of the Dell PowerEdge T20.

Table 19. Environmental specifications

Temperature	
Operating	5° to 35°C (41° to 95°F)
Non-operating (Storage)	-40° to 65°C (-40° to 149°F)
Relative humidity	20% to 80% (non-condensing)
Maximum vibration	
Operating	0.26Grms random at 5 to 350Hz
Non-operating	2.2Grms random at 5 to 500Hz
Maximum shock	
Operating	Bottom half-sine pulse with a change in velocity of 50.8 cm/sec (20 inches/sec)
Non-operating	105G half-sine pulse with a change in velocity of 133 cm/sec (52.5inches/sec)
Maximum altitude	
Operating	–15.2 to 3048 m (–50 to 10,000 ft)
Non-operating	–15.2 to 10,668 m (–50 to 35,000 ft)

Video specifications

Video specifications of the Dell PowerEdge T20 are detailed in Table 20.

Table 20. Video specifications

Graphic/Video options	
Integrated Intel HD Graphics P4000 with 2x DP + 1x VGA	X
Integrated Intel HD Graphics 4000 with 2x DP + 1x VGA	X

USB peripherals

USB peripherals are supported through the front and back USB ports on the T20. These ports are USB 3.0 compliant.

Appendix B. Standards compliance

The PowerEdge T20 system conforms to the industry standards in Table 21.

Table 21. Industry standard documents

Standard	URL for information and specifications
ACPI Advance Configuration and Power Interface Specification, v2.0c	acpi.info
Ethernet IEEE 802.3-2005	standards.ieee.org/getieee802/802.3.html
HDG Hardware Design Guide Version 3.0 for Microsoft Windows Server	microsoft.com/whdc/system/platform/pcdesign/desguide/serverdg.mspx
IPMI Intelligent Platform Management Interface, v2.0	intel.com/design/servers/ipmi
DDR3 Memory DDR3 SDRAM Specification, Rev. 3A	jedec.org/download/search/JESD79-3C.pdf
LPC Low Pin Count Interface Specification, Rev. 1.1	developer.intel.com/design/chipsets/industry/lpc.htm
PCI Express PCI Express Base Specification Rev. 2.0 and 3.0	pcisig.com/specifications/pciexpress
PMBus Power System Management Protocol Specification, v1.2	pmbus.info/specs.html
SAS Serial Attached SCSI, v1.1	www.t10.org
SATA Serial ATA Rev. 2.6; SATA II, SATA 1.0a Extensions, Rev. 1.2	sata-io.org
SMBIOS System Management BIOS Reference Specification, v2.7	dmtf.org/standards/smbios
TPM Trusted Platform Module Specification, v1.2	trustedcomputinggroup.org

UEFI Unified Extensible Firmware Interface Specification, v2.1	uefi.org/specs
USB Universal Serial Bus Specification, Rev. 2.0	usb.org/developers/docs
Windows Logo Windows Logo Program System and Device Requirements, v3.10	microsoft.com/whdc/winlogo/hwrequirements.mspx

Appendix C. Additional resources

Table 22 provides a list of documents and websites that provide for more information on the Dell PowerEdge T20.

Table 22. Additional resources

Resource	Description of contents	Location
Dell PowerEdge T20 Owner's Manual	This manual, available in PDF format, provides the following information: • Chassis features • System setup program • System messages • System codes and indicators • System BIOS • Remove and replace procedures • Troubleshooting • Diagnostics • Jumpers and connectors	Dell.com/Support/Manuals
Dell PowerEdge T20 Getting Started Guide	This guide is printed and shipped with the system, and is also available in PDF format on the Dell support site. This guide provides information on the following: • Initial setup steps • Key system features • Technical specifications	Dell.com/Support/Manuals
Cable Management Arm Installation	This printed document is provided with the CMA kits. The document provides the instructions for installing the cable management arm on the rails.	Dell.com/Support/Manuals
Information Update	This document is printed and shipped with the system, and is also available in PDF format on the Dell support site. This document provides information on system updates.	Dell.com/Support/Manuals
System Information Label	The system information label documents the system board layout and system jumper settings. Text is minimized due to space limitations and translation considerations. The label size is standardized across platforms.	Inside the system chassis cover
Quick Resource Locator (QRL)	This code on the chassis can be scanned by a phone application to access additional information and resources for the server, including videos, reference materials, service tag information, and Dell contact information.	Inside the system chassis cover
Power and cooling	Provides details for improving energy efficiency in the data center.	Dell.com/PNC
Operating system matrix for Dell PowerEdge systems	Provides updated information on which operating systems are available on which PowerEdge systems.	Dell.com/OSsupport

Resource	Description of contents	Location
Processor and chipset	Provides more information about the Intel processors and chipset.	Intel.com
Power distribution unit (PDU)	Provides help selecting a rack-based power distribution unit.	DellPDU.com
Uninterruptible power supply (UPS)	Provides help selecting an uninterruptible power supply model.	DellUPS.com
Volatility information	Contact your Dell sales representative.	Dell.com/Support/Manuals

Appendix D. System board block diagram

Figure 4. PowerEdge T20 system board block diagram